23x Indoor Speed Dome Camera

CAM-ISD48

User's Manual

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1. Safety Information

Federal Communication Commission (FCC) Statement

NOTE: This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference, the user is encouraged to try to correct the interference by on or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Correct the equipment into an output o a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio / television technician for help
- FCC Caution: To assure continued compliance, any change or modification not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Notice for customers in Canada

CAUTION

- This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

ATTENTION

- Cet appareil numerique de laclasse B respects toutes les exigencies du Reglement sur le materiel brouilleur du Canada

2. Preface

Congratulations for the purchasing of the world most compact PTZ (**P**an, **T**ilt and **Z**oom) camera. The camera is designed and manufactured not just to meet the requirements for traditional CCTV and modern digital surveillance, but also increase the systems' overall performance.

This camera line incorporates high resolution color CCD, with two types of lens available: power zoom or vari-focal. Some image and special effect functions are related to the type of lens, while other functions are the same across the line.

The PT mechanism provides controllable panning (360^o) and tilting (90^o)+ auto-rotation (180^o) functions, giving users the capability to manipulate the camera for precise locating on target. The built-in micro-controller allows users to program up to 64 presets for quick and accurate capture to specific view positions. Moving speed, ranging from 0.25 to 300 degrees per second and is selectable to controller, is variable in 16 optional levels. Dwell time of each view position is also selectable from 1second up to 255 seconds.

System function includes I/O for alarm function for intrusion management, ID setup (maximum to 128) and impedance matching option for multiple node system, 3 control protocols, 3 options of baud rates, RS-485 communication format. This device is driven by DC12V power. It can be controlled by keyboard, PC, video server or standalone DVR.

For the power zoom version, a number of image related functions (such as DSP functions, lens functions, special effects of video…) are managed via OSD (On-Screen-Display) menu. These functions are explained in the section of OSD with details. The CCD can be set up for automatic switching to black-white mode for night-vision ready when illumination is low.

This camera is designed to be water-resistant for outdoor use, under the condition of normal temperature range from -10^o to 50^o C. A companion outdoor housing is also available for severe weather condition (extreme low or high temperature environment).

3. Features

- High resolution color CCD 480 TV lines
- 23x optical / 10x digital zoom
- Continuous panning for 360^{o}; Tilt for 90^{o} +auto-rotation (180^{o})
- Fast rotation speed, up to 300^{o} per second
- RS-485 digital control, supporting multi-nude topology
- BNC connector for video output
- Programmable for view position, speed and dwell
- View position preset, up to 64 points
- Auto-pan and 4 groups of tour
- 3 alarm inputs and 1 alarm output
- Compatible with Pelco D and Pelco P protocols
- Internal ID setup function, maximum to 128
- Compatible with keyboard and DVR for CCTV system
- Compatible with PC and video server for WAN / LAN surveillance
- For embedded, surface, wall and ceiling mount
- External housing for severe outdoor environment (Option)

4. Appearance

4.1 To Access DIP Switches

Before the camera is mounted in place, be sure the following four settings are properly executed, or the camera may fail the control:

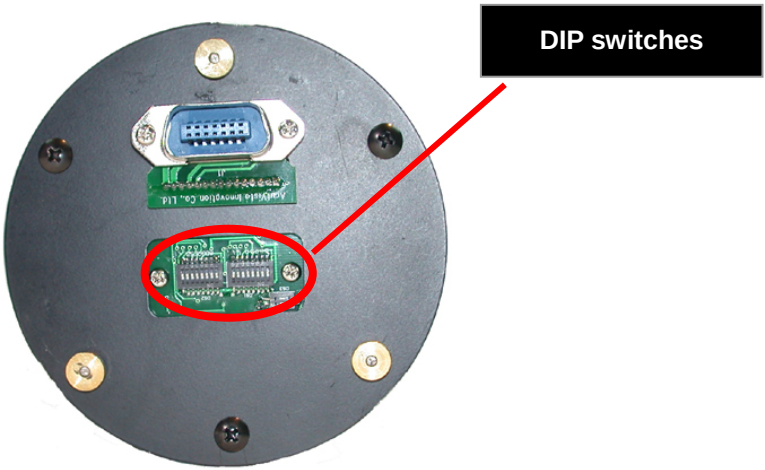
- **Camera ID setup**
- **Protocol selection**
- **Baud rate selection**
- **Termination impedance**

Tools:

Use pencil, pincer, paper clip or small flat screw driver, to move the lever of DIP switch

Access points:

The DIP switches are located on the bottom of the dome cameras:



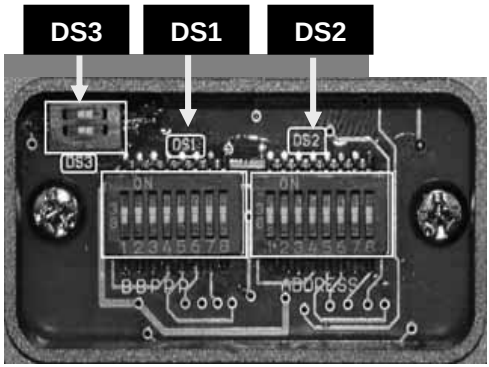
4.2 DIP switches

Overview of DIP switches

There are three sets of DIP switch on board for different setup purposes.

location #	bit quantity	used for
DS1	8	Protocol / baud rate setup
DS2	8	Device ID setup
DS3	2	Network impedance

Refer to the picture on below for DIP switch locations.



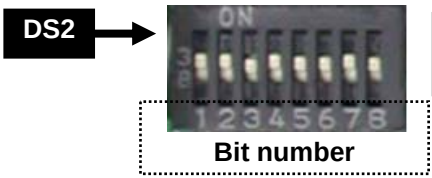
In the following paragraphs are the detail descriptions of the three main setups the installer must do, before hardware mounting and cabling work should begin.

4.3 Set Up Device ID Number

To build correct network for control communication, every speed dome camera in the network must have an **unique ID number**, which is set by the bit 1 to 8 of a 8-bit DIP switch **DS2.**

Note:	**Factory default of device ID is 1**

- Find 8-bit DIP switch DS2 on the PC board



remark: Dash line "---" in table means to set the bit to "OFF" position

- Refer to the tables in the next two pages for ID setting (the tables will show the relation between pin assignments of DIP switch and ID numbers 1 to 128)
- Since the highest ID of this camera is 128, maintain the **bit number 8 in OFF position all the time.**
- All the speed domes in a network must have their unique ID. It is highly recommended to installers, for future maintenance and users' convenience, to mark the ID of each camera onto its corresponding location on the site map, and make out a list of cameras with their ID numbers.
- The DS2 pin assignment for ID setup is in binary format.

ID table (1 ~ 64)

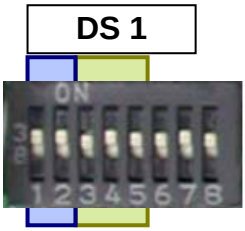
ID	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
1	--	--	--	--	--	--	--	--	33	--	--	--	--	--	on	--	--
2	on	--	--	--	--	--	--	--	34	on	--	--	--	--	on	--	--
3	--	on	--	--	--	--	--	--	35	--	on	--	--	--	on	--	--
4	on	on	--	--	--	--	--	--	36	on	on	--	--	--	on	--	--
5	--	--	on	--	--	--	--	--	37	--	--	on	--	--	on	--	--
6	on	--	on	--	--	--	--	--	38	on	--	on	--	--	on	--	--
7	--	on	on	--	--	--	--	--	39	--	on	on	--	--	on	--	--
8	on	on	on	--	--	--	--	--	40	on	on	on	--	--	on	--	--
9	--	--	--	on	--	--	--	--	41	--	--	--	on	--	on	--	--
10	on	--	--	on	--	--	--	--	42	on	--	--	on	--	on	--	--
11	--	on	--	on	--	--	--	--	43	--	on	--	on	--	on	--	--
12	on	on	--	on	--	--	--	--	44	on	on	--	on	--	on	--	--
13	--	--	on	on	--	--	--	--	45	--	--	on	on	--	on	--	--
14	on	--	on	on	--	--	--	--	46	on	--	on	on	--	on	--	--
15	--	on	on	on	--	--	--	--	47	--	on	on	on	--	on	--	--
16	on	on	on	on	--	--	--	--	48	on	on	on	on	--	on	--	--
17	--	--	--	--	on	--	--	--	49	--	--	--	--	on	on	--	--
18	on	--	--	--	on	--	--	--	50	on	--	--	--	on	on	--	--
19	--	on	--	--	on	--	--	--	51	--	on	--	--	on	on	--	--
20	on	on	--	--	on	--	--	--	52	on	on	--	--	on	on	--	--
21	--	--	on	--	on	--	--	--	53	--	--	on	--	on	on	--	--
22	on	--	on	--	on	--	--	--	54	on	--	on	--	on	on	--	--
23	--	on	on	--	on	--	--	--	55	--	on	on	--	on	on	--	--
24	on	on	on	--	on	--	--	--	56	on	on	on	--	on	on	--	--
25	--	--	--	on	on	--	--	--	57	--	--	--	on	on	on	--	--
26	on	--	--	on	on	--	--	--	58	on	--	--	on	on	on	--	--
27	--	on	--	on	on	--	--	--	59	--	on	--	on	on	on	--	--
28	on	on	--	on	on	--	--	--	60	on	on	--	on	on	on	--	--
29	--	--	on	on	on	--	--	--	61	--	--	on	on	on	on	--	--
30	on	--	on	on	on	--	--	--	62	on	--	on	on	on	on	--	--
31	--	on	on	on	on	--	--	--	63	--	on	on	on	on	on	--	--
32	on	on	on	on	on	--	--	--	64	on	on	on	on	on	on	--	--

ID table (65 ~ 128)

ID	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8
65	--	--	--	--	--	--	on	--	97	--	--	--	--	--	on	on	--
66	on	--	--	--	--	--	on	--	98	on	--	--	--	--	on	on	--
67	--	on	--	--	--	--	on	--	99	--	on	--	--	--	on	on	--
68	on	on	--	--	--	--	on	--	100	on	on	--	--	--	on	on	--
69	--	--	on	--	--	--	on	--	101	--	--	on	--	--	on	on	--
70	on	--	on	--	--	--	on	--	102	on	--	on	--	--	on	on	--
71	--	on	on	--	--	--	on	--	103	--	on	on	--	--	on	on	--
72	on	on	on	--	--	--	on	--	104	on	on	on	--	--	on	on	--
73	--	--	--	on	--	--	on	--	105	--	--	--	on	--	on	on	--
74	on	--	--	on	--	--	on	--	106	on	--	--	on	--	on	on	--
75	--	on	--	on	--	--	on	--	107	--	on	--	on	--	on	on	--
76	on	on	--	on	--	--	on	--	108	on	on	--	on	--	on	on	--
77	--	--	on	on	--	--	on	--	109	--	--	on	on	--	on	on	--
78	on	--	on	on	--	--	on	--	110	on	--	on	on	--	on	on	--
79	--	on	on	on	--	--	on	--	111	--	on	on	on	--	on	on	--
80	on	on	on	on	--	--	on	--	112	on	on	on	on	--	on	on	--
81	--	--	--	--	on	--	on	--	113	--	--	--	--	on	on	on	--
82	on	--	--	--	on	--	on	--	114	on	--	--	--	on	on	on	--
83	--	on	--	--	on	--	on	--	115	--	on	--	--	on	on	on	--
84	on	on	--	--	on	--	on	--	116	on	on	--	--	on	on	on	--
85	--	--	on	--	on	--	on	--	117	--	--	on	--	on	on	on	--
86	on	--	on	--	on	--	on	--	118	on	--	on	--	on	on	on	--
87	--	on	on	--	on	--	on	--	119	--	on	on	--	on	on	on	--
88	on	on	on	--	on	--	on	--	120	on	on	on	--	on	on	on	--
89	--	--	--	on	on	--	on	--	121	--	--	--	on	on	on	on	--
90	on	--	--	on	on	--	on	--	122	on	--	--	on	on	on	on	--
91	--	on	--	on	on	--	on	--	123	--	on	--	on	on	on	on	--
92	on	on	--	on	on	--	on	--	124	on	on	--	on	on	on	on	--
93	--	--	on	on	on	--	on	--	125	--	--	on	on	on	on	on	--
94	on	--	on	on	on	--	on	--	126	on	--	on	on	on	on	on	--
95	--	on	on	on	on	--	on	--	127	--	on	on	on	on	on	on	--
96	on	on	on	on	on	--	on	--	128	on	on	on	on	on	on	on	--

4.4 Control Protocol and Baud Rate

Control protocol and baud rate must be set correctly in the dome camera in order to establish proper control communication between the camera and control device.
Be sure that the same protocol and baud rate must be implemented in control device, too.
3 types of protocol and 3 levels of baud rate are provided by this speed dome, through an 8-bit DIP switch labeled DS1.



remark:
1. "--" means to set the bit to "OFF" position
2. Bit 1 and 2 are for baud rate setup
3. Bit 3, 4 and 5 are for protocol selection
4. Bit 6 is reserved future use
5. Bit 7 is for firmware upgrade
6. Bit 8 is for cooling fan on / off switching

- First, installer needs to choose a communication protocol with bit number 3, 4 and 5. Watch that the same protocol is chosen for speed dome and controller. The following table shows the three protocols provided in this speed dome. **Check what are available in the controller before choosing the protocol.**

3	4	5	Protocol
--	--	--	Pelco-D
on	--	--	Pelco-P
--	on	--	Reserved
on	on	--	Reserved

- Bit 1 and 2 are for baud rate setup. Same baud rate must be set up for the speed dome and control device, or communication fro control will fail.

1	2	Baud rate
--	--	2,400 bps
on	--	4,800 bps
--	on	9,600 bps

4.5 RS-485 Network and Impedance

Transmission distances of RS-485 Bus

The 0.56mm (24AWG) twisted pair or higher grade wires are recommended for data transmission cable.

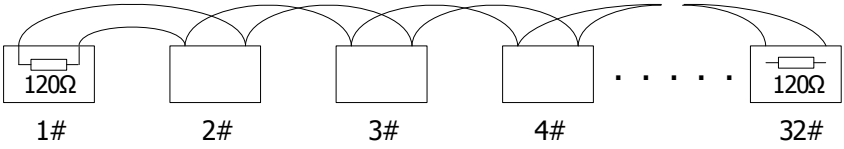
The maximum theoretical transmitting distances, for the AWG#24, are as follows:

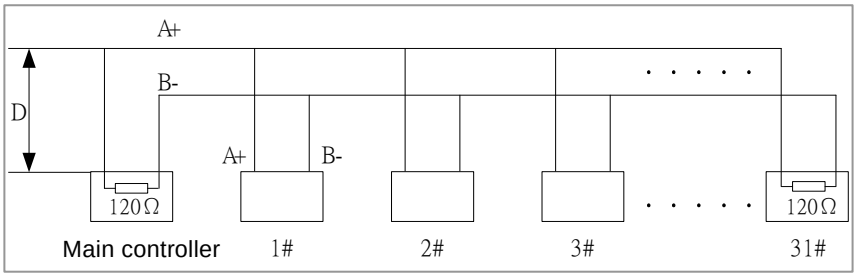
Baud Rate	Maximum Transmitting Distance
2400 Bps	1800m
4800 Bps	1200m
9600Bps	800m

If user selects thinner cables, or installs the dome in an environment with strong electromagnetic interference, or connects lots of equipment to the RS-485 bus, the maximum transmitting distance will be decreased. To increase the maximum transmitting distance, do the contrary, i.e. use thicker wire and keep the cable away from the interference.

Connection and termination resistor

The RS-485 standard requires a daisy-chain connection among the equipments. There must be termination resistors of proper impedance (typically 120 ohms, within the range from 90 to 250 ohms) at both ends of the connection.





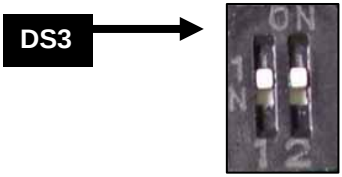
Impedance setup for the speed dome

Each speed dome camera has a termination resistor built in.

In a network of RS-485 chain, the speed domes are classified in two categories: **end unit** (such as the #31) and **node** (such as #1 through #30).

To set up the resistor correctly, installer must decide if the specific dome camera is the termination device or not, i.e. if it is at the end of the RS-485 chain.

The impedance setup is provided by the bit 1 and bit 2 of DIP switch **DS3 .**



Bit 1	Bit 2	Impedance
--	--	**Open (device on node)**
On	On	**Standard 120 ohms (device at end)**

- For nodes: Set both of Bit 1 and Bit 2 to **OFF** position
- For end unit: Set both of Bit 1 and Bit 2 to **ON** position

Impedance of the control unit

This is generally for two cases: controller with RS-485, and controller with RS-232.

Controller with RS-485:

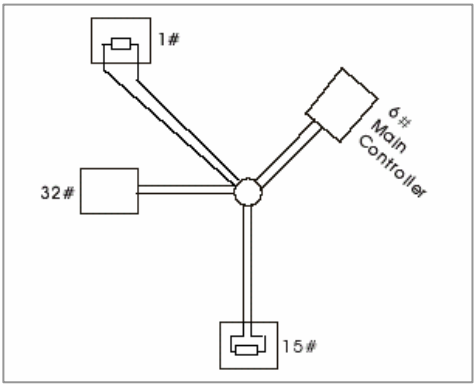
Most keyboard and video server in market have RS-485, which are equipped with termination resistor to drive a RS-485 system.

But most PC and notebook sort of devices have RS-232 or USB port but no RS-485. Therefore, for PC system, a RS-232 or USB to RS-485 converter is required. So installer must check out if the converter has proper termination resistor.

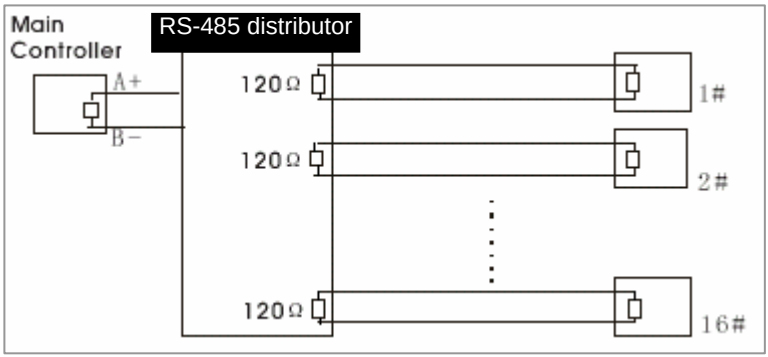
Problems in practical connection

In some circumstances user adopts a star configuration in practical connection. The termination resistors must be connected to the two equipment that are farthest away from each other, such as equipment 1# and 15# in the following picture. As the star configuration is not in conformity with the requirements of RS-485

standards, problems such as signal reflections, lower anti-interference performance arise when the cables are long in the connection. The reliability of control signals could be downgraded with the phenomena that the dome does not respond to or just responds at intervals to the controller, or does continuous operation without stop



In such circumstances the usage of RS-485 distributor is recommended. The distributor can change the star configuration connection to the mode of connection stipulated in the RS-485 standards. The new connection achieves reliable data transmission.

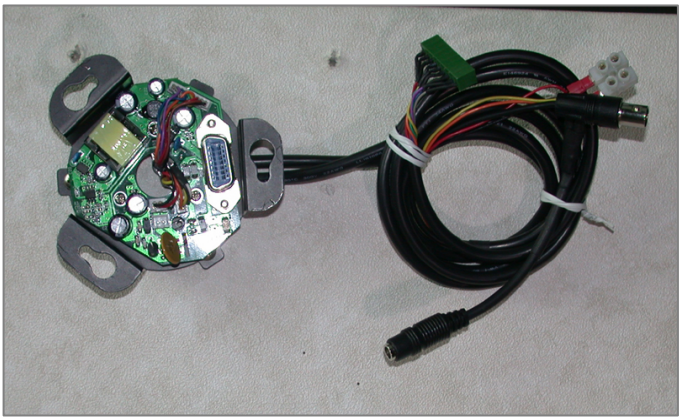


5. Mount The Speed Dome Camera

The camera and its mounting system are designed in modules. There are 5 methods to mount the PTZ camera, which are:

1. **Attached to the ceiling surface directly**
2. **Embedded into ceiling**
3. **Held to ceiling surface through a bracket (ceiling-drop)**
4. **Mounted to wall through a bracket**
5. **Adapted into external housing**

For all these five mounting ways, a common mounting base for mechanical locking and signal interface shall be adapted as below.



In the next page there is a list of all the accessories provided with the camera for various environments.

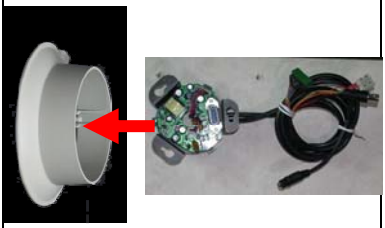
5.1 Mounting Accessory

The following items are supplied with the speed dome for the camera mounting.

	Description	The look	The Use
1	**Plastic ring**		To hold the camera embedded on ceiling Must be used with the metal ring together to hold the PTZ camera..
2	**Metal ring**		To hold the camera embedded on ceiling Must be used with the plastic decoration ring together to hold the PTZ camera.
3	**Mounting base**		The interface for holding the camera and bridging signals
4	**Plastic Housing for surface mount**		To hold the camera on ceiling surface
5	**Metal Bowl holder**		To work with item 3 for creating ceiling or wall mount

5.2 Surface mount

1. Before installation starts, put mounting base and plastic housing together to make a base module
2. Locate the base module onto the place the camera is to be mounted, and fix the base on the surface completely with screws through the 3 holes on the base (be sure the cables are well located throughout the cable outlet)
3. Get the camera and plug it onto the base; watch for the direction of the connectors on camera and mounting base and be sure they are mated well. Then rotate the camera body counter-clockwise until it is completely locked
4. Put the safety screw (anti-loss) in locking position and screw it in

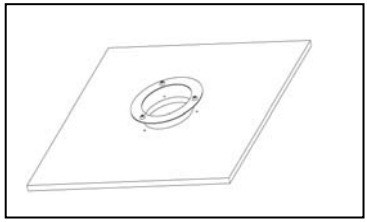
<table>
<tr>
<td>Integrate the mounting base and the plastic housing as a module
  </td>
<td>Mounting the module to the surface
 </td>
</tr>
<tr>
<td>Fit the camera into the module and lock it in position
 </td>
<td>Put the safety screw in place
 </td>
</tr>
</table>

In case of dealing with a **concrete** surface:

a. Mark the locations for screw through the holes on the base
b. Make holes on the wall, then insert the supplied plastic plugs into the holes and squeeze them in until they are flush with the wall surface.
c. Mount the base on the desired place tightly with screws

5.3 Embed Camera Into Ceiling

Step 1 **make holes**

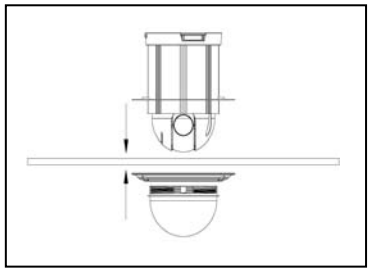


To insert the speed dome into the ceiling, first a hole must be properly made to let the dome be through for hanging.

The best way to decide the diameter of the hole, and the spots for mounting screws, is to use the supplied metal holder.

- Put the holder on the surface of the target location and mark a circle with pencil or color marker
- Also mark out the spots for screws with the screw holes on the holder
- Cut the camera hole alone with the curve
- Drill holes for screw in 6 mm (1/4") on the three marked spots;

Step 2 **Integrate the decoration ring with camera**

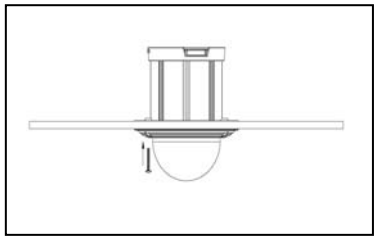


The decoration ring is not just for nice looking, but also the piece to hold the camera in place for embedded mounting.

To integrate the ring to camera:

1. Take the transparent dome cover off
2. Locate the ring to the bottom side of the cover
3. Put the cover back to the camera

Step 3 **Mount the camera through the hole**



Take the below steps to make the camera cling to ceiling:

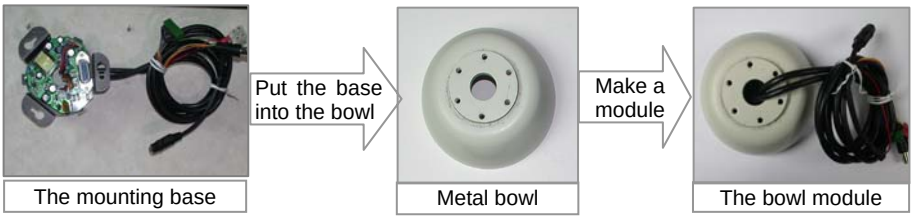
1. Place the auxiliary metal bracket onto the top of the ceiling
2. Put the camera through out the hole
3. Align the screw holes of the decoration ring and the auxiliary bracket
4. Put screws through and tighten the two brackets, with the ceiling in between

5.4 Ceiling-drop mount (with CAM-CM)

Pre-assembling of the Bowl Module

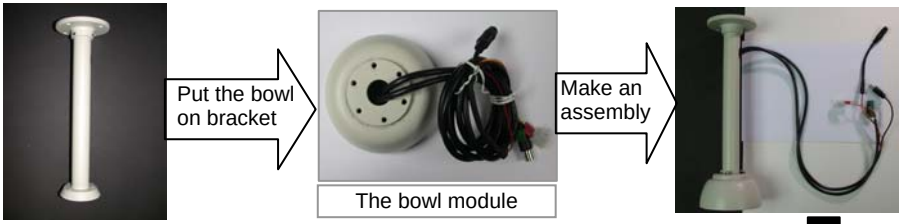
Both ceiling-drop and wall-mount needs to have a bowl module, an assembly of the mounting base and metal bowl supplied in the mounting kit, be built first.

Follow the flow chart on below for building up the bowl module.



To drop camera from ceiling, take the ceiling bracket (option item) and bowl module,

1. put the cables into the tube and have them come out from cable outlet
2. put the bracket on top of the bowl and tight them together with screws



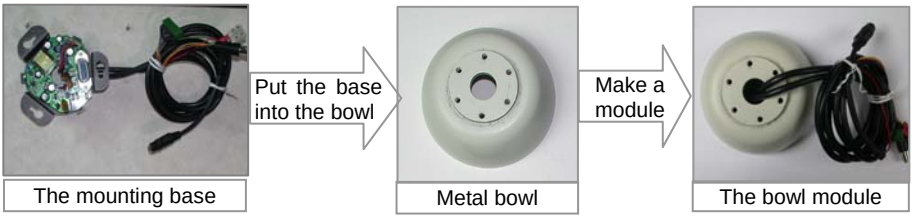
3. Locate the assembled piece onto the place the camera is to be mounted, and fix it on the surface completely with screws through the 3 holes on the bracket
4. Get the camera and plug it onto the base; watch for the direction of the connectors on camera and mounting base and be sure they are mated well. Then rotate the camera body counter-clockwise until it is completely locked
5. Put the safety screw (anti-loss) in locking position and screw it in

5.5 Wall mount (with CAM-WM)

Pre-assembling of the Bowl Module

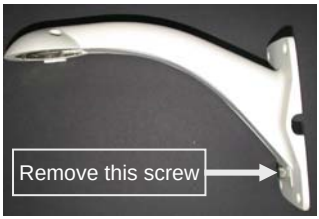
Both ceiling-drop and wall-mount needs to have a bowl module, an assembly of the mounting base and metal bowl supplied in the mounting kit, be built first.

Follow the flow chart on below for building up the bowl module.



Mount the camera on wall

To mount camera on wall:



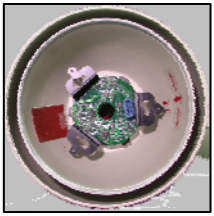
1. Take the wall-mount bracket (optional item), put it on the target place and fix it with the supplied screws (total of 4)
2. Take the cover-screw off the bracket, and remove the cover from bracket
3. Attach the bracket on top of the bowl and tight them together with screws
4. Put the cables in the trench of bracket, and all connectors come out through the cable outlet. Then put cover and screw back.

5. Locate the assembled piece onto the place the camera is to be mounted, and fix it on the surface completely with screws through the 4 holes on the bracket
6. Get the camera and plug it onto the base; watch for the direction of the connectors on camera and mounting base and be sure they are mated well. Then rotate the camera body counter-clockwise until it is completely locked
7. Put the safety screw (anti-loss) in locking position.

5.6 Use External Housing (with CAM-OH)

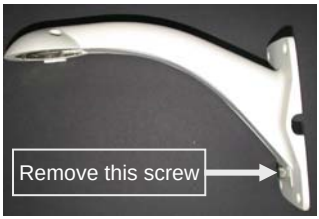
To operate speed dome cameras and maintain all functions in normal in severe temperature conditions, i.e. below -10°C or above 45°C, external housing is required.
CAM-OH has included two brackets (Ceiling-mount and Wall-mount bracket). You can choose which one you will like to used.

Inside the housing, the mounting base (item # 3 in the accessory list) is already built before it leaves factor. (see picture on the right).

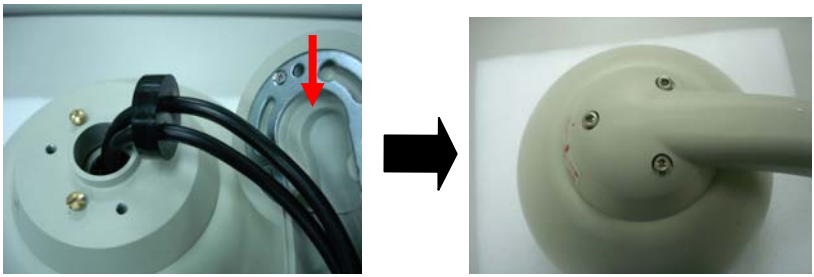


Wall mount Installation Procedure

1. Take the wall mount bracket, put it on the target place and fix it with the supplied screws (total of 4).
2. Take the cover-screw off from the bracket, and remove the cover.



3. Please stuff the water proof rub ring into the bracket. Then attach the bracket and lock it to the housing. Tight them on with screws.



4. Put the cables in the trench of bracket, and all connectors come out through the cable outlet. Then put bracket cover and screw back.

5. Load the camera into the housing. Be sure the connectors are well mated and then rotate the camera to lock it in position.

6. Put the safety screw in locking position and tight it.

Finished device

Ceiling mount Installation Procedure

1. Insert the cables pass through the tube. Please also stuff the water proof rub ring into the iron cover on tube.

2. Close the tube onto the outdoor housing and lock it to the housing. Tight them on with screws.

3. Finished.

6. Connecting Wires

The cables, wires and connector attached to the speed dome are categories into 4 major functions of:

1. Power
2. Video
3. RS-485
4. Alarm-in and out

They are easily distinguished from one to another, as being featured with different connectors. Refer to the picture on below to learn about cable and connector information.

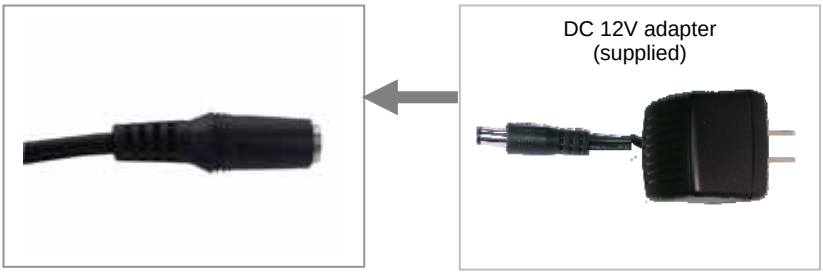
6.1 Power

The camera will obtain power source from two kinds of power: DC12V or AC24V.

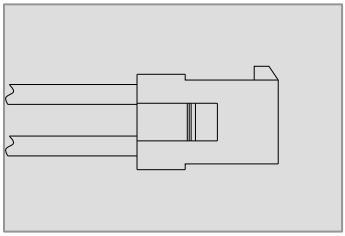
1. Without outdoor housing, DC12V:

   When operated with DC12V, the camera may consume 1000mA DC current in full load condition. To power the speed dome is simple. Get the DC jack from the camera, and connect the adapter plug to the jack.

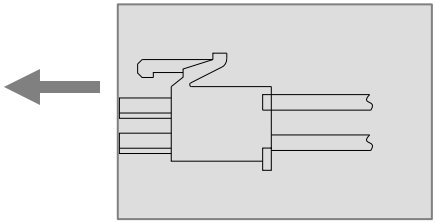
   Note: To secure the safety and maintain correct function, always use the switching DC 12V / 1.5A power adapter. The **switching type power adapter** is strongly recommend. Due to switching power adapter can output stable power source, that can prevent the speed dome camera from damage.



2. With outdoor housing, AC24V:
   An AC adapter of 24V / 1.66A is supplied with the outdoor housing (CAM-OH) for the AC version. To power the camera, connect adapter to camera's power connector.



Power Connector on Speed Dome



AC 24V Connector on Adaptor

As soon as power is supplied, the speed dome will enter "initial check" mode with the following procedures:

- Move the lens automatically for system check
- Screen comes up with blue picture and will be showing "starting" in white for around 3 seconds
- Then the camera will show normal image and get ready for control

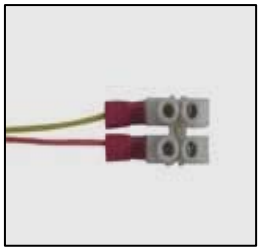
6.2 Video

Video output level of the camera, in standard of 1Vp-p, is delivered with female BNC connector at 75 ohms impedance. To transmit the video to receiver properly, it is recommended to use RG-59 A/U coaxial cable with stranded center conductor, with male BNC connectors on both ends.

RG-59 is also in 75 ohm impedance, which matches the camera's output impedance. The A/U version is recommended, rather than the version B/U, due of its superior performance on flexibility for resisting severe twisting, bending and other stresses which occur in many CCTV installations.

In case the installation distance is over than 500 meters (1,500 feet), additional amplifier might be needed to keep the video level and image quality.

6.3 RS-485



The camera adapts RS-485 in half-duplex pattern, which is a two-pin connectivity, as shown on the right picture.

Installer must pay attention to the polarity of these two pins – yellow wire is the POSITIVE end, and orange is the NEGATIVE. Communication between controller and camera will break and control will not function if they are reversely connected.

The RS-485 communication may run for 4,000 feet if the system network is properly built. Two important factors should be handled with care during the system build-up--- baud rate and termination impedance. More information about RS-485 are in sections "**Protocol and Baud rate**" and "**Applications**".

6.4 Alarm Input and Alarm Output

This camera is equipped with 3 alarm inputs and one alarm output for intrusion management. Installers may connect the inputs to the various sensors and program the camera to move and monitor specific spots for monitoring when evens take place. Dwell time for monitoring is programmable, subject to the system. Refer to the diagram on right for function assignments of the alarm I/O.

Alarm in	Wire Color	Alarm GND	Wire Color	Alarm out	Wire Color
Alarm in 1	Black	Alarm 1	Brown	N.O.	Gray
Alarm in 2	Red	Alarm 2	Orange	N.C.	Purple
Alarm in 3	Yellow	Alarm 3	Green	Com.	Blue

Alarm inputs

This speed dome has three alarm inputs, and each input is given by the software a companion view preset. When trigger single is sent to alarm-in, the following reactions will be taken by the speed dome:

- The pan-tilt mechanism will move lens to the preset.
- The alarm-out port will act.
- Via RS-485, the console (control unit) will be notified

The three inputs and their correspondent view presets are independent from one to another. Therefore, with the connections to three sensors, installer can set up camera to monitor three different spots with different dwell time.

Presets For Events

Default settings at the alarm-ins activations are:

If setting(s) is / are done to presets 17, 18 and 19 :

- At the trigger of alarm-in number 1, lens will move to preset 17.
- At the trigger of alarm-in number 2, lens will move to preset 18.
- At the trigger of alarm-in number 3, lens will move to preset 19.

If one or more positions of presets 17, 18 and 19 is / are empty:

- At the trigger of alarm 1, lens will move to preset 1 (preset 17 is empty)
- At the trigger of alarm 2, lens will move to preset 2 (preset 18 is empty)
- At the trigger of alarm 3, lens will move to preset 3 (preset 19 is empty)

Note:

- All the three alarm inputs are TTL level and triggered by negative signals.
- To utilize the default view positions, user must pre-set the desired monitor spots to presets number 17, 18 and 19 (or 1, 2 and 3).

Alarm-ON Management Protocol

With the presetting of its internal software, the PTZ camera will perform the following functions automatically at the triggering(s) to alarm-input(s):

- Camera is running Auto-pan when alarm signal(s) kicks in

1. When the first alarm signal hits this camera, lens will move to the corresponding presets (see relative information on above) at maximum speed of 300^{o} per second
2. Lens will stay at the preset position for 60 seconds
3. Camera will be back to the original auto-pan function after 60 seconds, if no second alarm-in jumps in this 60 second time frame.
4. In case second and third alarm kicks in during the 60 seconds, camera will move to the corresponding preset(s) and stay for 10 seconds initially, then move to the next alarm-preset for 5 seconds and keeps the motion in cycles until the 60 second time frame is over.
5. Camera will be back to its original auto-pan function after the 60 seconds.

- Camera is in steady mode when alarm signal(s) kicks in

  1. When the first alarm signal hits this camera, lens will move to the corresponding presets (see relative information on above) at maximum speed of 300^{o} per second
  2. Lens will stay at the preset position for 60 seconds
  3. Camera will be back to the original position after 60 seconds, if no second alarm-in jumps in this 60 second time frame.
  4. In case second and third alarm kicks in during the 60 seconds, camera will move to the corresponding preset(s) and stay for 10 seconds initially, then move to the next alarm-preset for 5 seconds and keeps the motion in cycles until the 60 second time frame is over.
  5. Camera will be back to its original position after the 60 seconds.

Alarm output

The alarm output is a hardware toggle switch of NC (normal close) and NO (normal open). In the event the camera receives trigger signal from one of the three alarm-inputs, the output ports will swap their states (i.e. the NC port will turn into OPEN condition, and the NO port will become CLOSE). The changing state can be used for activating various external alarm devices, such as siren, recorder, alarm-light or call-out system.
Alarm-on status will be automatically relieved at the 30th minute from the triggering point and PTZ will be back to the original conditions. To relief system the alarm-on status earlier, please use the MANUAL OFF on the controller (subject to the function's availability to the controller)

Warning:

The NC/NO port provided by alarm-out is a mechanical contact relay.
Make sure the device connected to the alarm-output does not drain current over than 0.5A and the voltage is not higher than DC 24V or AC 250V. Any load over these may damage the output port permanently.

7. Applications

The PTZ camera, by itself alone or encompassed in different numbers of domes with comprehensive matrix switching, is mainly for link to 4 different control means (also known in different terms such as **controller**, **console** or **host**):

- **PC-based system**
- **Keyboard controller**
- **DVR** (Digital Video Recorder)
- **Video server**

7.1 Controllers and RS-485

While most keyboards, DVRs and video servers are equipped with RS-485 port, which can be directly connected to speed dome, desk top and notebook computers usually don't provide direct output of RS-485. Therefore an interface device (signal converter) will be needed when computer is used as the controller.

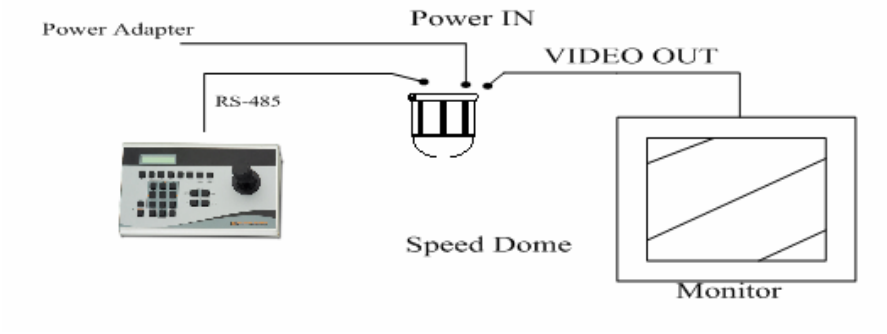
Signal converter

Note:
Check the PC first to see if RS-232 port or USB port is available to the specific unit. Some may have both while others only have one of the two.

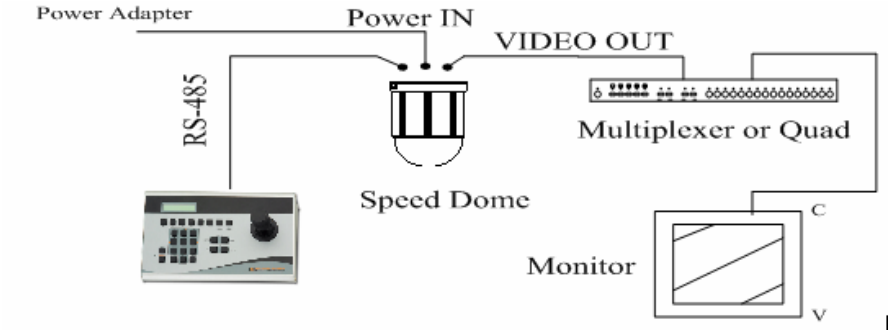
7.2 Connect single dome to console

- Connect the RS-485 of camera to controller (such as a keyboard) with a pair of twisted cable. Tele-control is sent via the cable between dome and controller.
- Video signal from the dome is sent to multiplexer, monitor, DVR or video server directly, normally through coaxial cable (usually the RG-59 A/U).
- Power (DC12V or AC24V) shall be applied to the camera via separate DC or AC adapter.
- Usually the termination resistor in speed dome is set to **OPEN** when only one is connected console.
- Select a proper protocol and corresponding baud rate for the controller. Be sure both sides (camera and controller) have the same protocol and baud rate.

Connect to keyboard + monitor

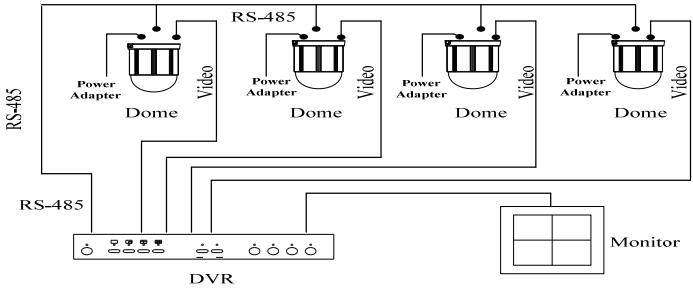


Connect to keyboard + MUX

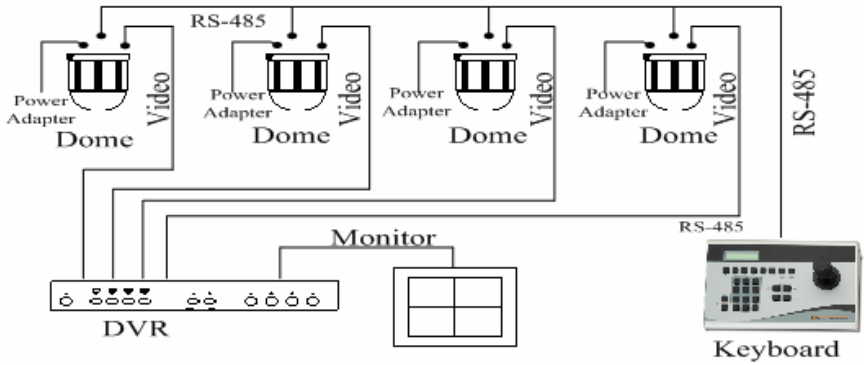


Connect Speed dome to standalone DVR

- Connect the RS-485 of camera to controller (in this case, the DVR) with a pair of twisted cable. Tele-control is conducted from the DVR via the cable between the PTZ device and DVR.
- Video signal from the dome is sent to DVR also, then forwarded to monitor through the multiplexer inside the DVR. Usually RG59 A/U coaxial cable is recommended for the video connection.
- Power (DC12V or AC24V) shall be applied to the camera via separate DC or AC adapter.
- Set the termination resistor in speed dome to **OPEN** mode (disconnected) if only one speed dome is connected console.
- If two or more speed domes are in the system, the termination resistor of END unit should be loaded (more information is in the next section).
- Select a proper protocol and corresponding baud rate for the DVR. Be sure both sides (PTZ camera and DVR) have the same protocol and baud rate.



- In case the DVR does not have PTZ control function, use a separate keyboard for the PTZ controlling. Protocol shall be properly selected, too.



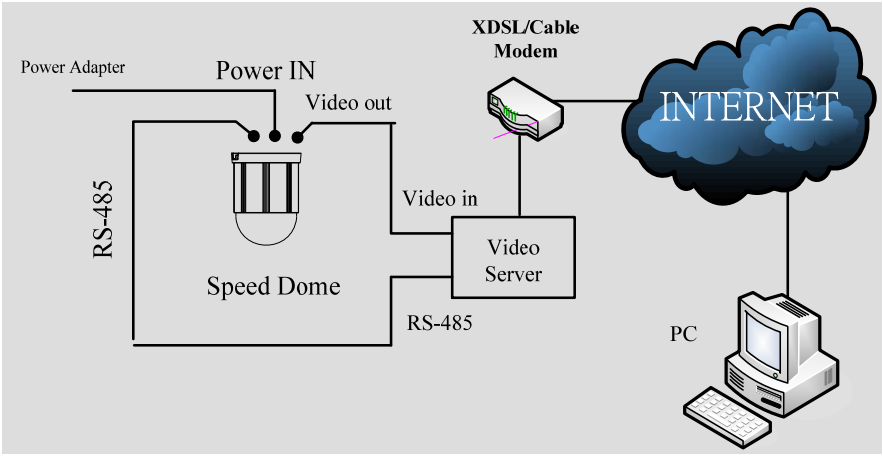
Connect Speed dome to video server

Video server, the contemporary device for transmitting video throughout LAN and WAN, can also be the controlling tool for this speed dome camera.

Most video servers in market are built with RS-485 communication port, and single video input for connecting one camera. To work with this PTZ camera, installer must connect both signals (video and RS-485) from the server to the camera, as the picture shown on below.

First of all, the **camera ID should be kept on number "0"** (zero) **or 1** (one) when it is linked to a video server, unless your video server requires different ID. Be sure the RS-485 polarity is correctly handled. Once the connectivity is completed, start the video server control panel on computer and follow the instructions on below during the video server setup

- Choose **Pelco D** as the control protocol
- choose **RS-485** as the communication format
- baud rate matches the setting in camera; "**2400"** is recommended
- parity is set to "**0**" (zero) or "**None**"
- Data bit is "**8**" (eight)
- Stop bit is "**1**" (one)



You may conduct control to the speed dome after these are correctly set up. For advanced functions, you must follow the instructions given by the video server manual.

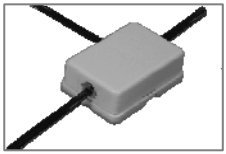
7.3 Connect two or more domes to console

As the RS-485 supports multi-drop topology, two or more domes can be connected to one controller in a system. For such application, the following rules must be kept:

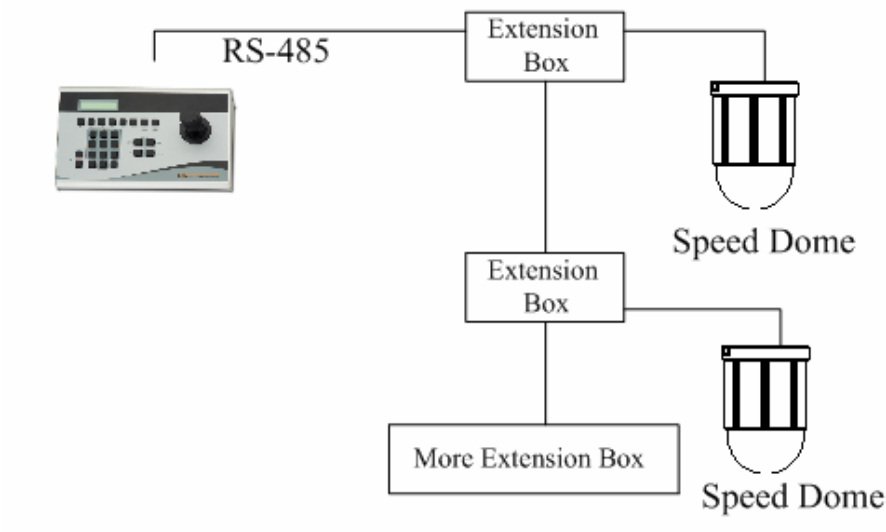
- All the speed domes should be connected to host in daisy chain pattern. Star type of configuration should be prohibited to avoid system instability.
- Each dome must have unique ID so communication data can be delivered to the correct target device.
- Impedance-match setup is also required to keep communication quality.

Connect the other end of the cable to a phone jack box with extension outlet of two. Installer must **pay attention to the pins** of the extension box to ensure the connection is correct.

To connect more cameras, copy the same procedure on above. You may continue extending the quantity of camera to its maximum number of 128 per network, if the control device has the capability of addressing that many ID..



Extension box

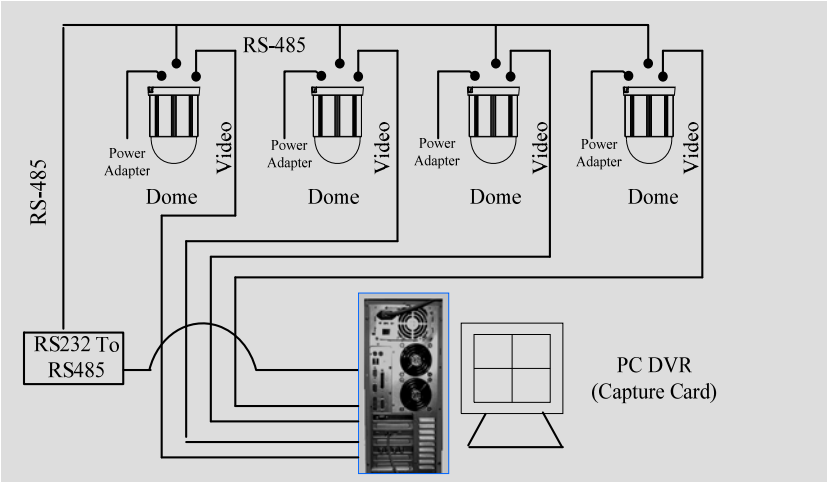


The extension wire and box are available in general electronic and phone shops.

■ **Connect Speed Dome and PC** (Capture Card)

When PC is used as the console, installer needs to connect both of video and RS-485 signals to PC separately.
Most capture cards have 4 video input per card, and normally each PC can handle 4 cards, meaning up to 16 cameras can be hooked to one PC.

- Video: connect the camera video to the video-in of capture card.
- RS-485: the RS-485 shall be connected to the RS-232 or USB port through an signal converter. Refer to the previous section for the establishment of the RS-485 network (watch the different ways of impedance setup for terminal device, for single or multiple domes per network)



- Power: camera's power is to be connected locally with the supplied DC or AC adapter.

8. Camera setup --- OSD functions

For the version with Power Zoom, many functions are available to users for setup and fine tune through controllers. To access the functions and make adjustment, follow the instructions on below:

(**NOTE**: all the procedure in this paragraph is NOT applied to the version of vari-focal lens)

8.1 OSD operation

1. To initiate the OSD setup function, exercise “preset 88” (a simulated function call) at keyboard. Due to the procedure may vary from one keyboard to another, please read the keyboard manual first.
2. After menu is displayed, use **up** and **down** controls (joystick or arrow keys) to locate the target item. The under-seized item will blink, and screen will move to next or previous page if moving forward over the end.
3. When the item is captured, move joystick to the **right-hand** direction or press the **“right” button** (normally is marked as ►) to confirm setting and update memory, or enter the sub-menu.
4. To exit menu, move joystick to left-hand direction, or press the **“left”** button (sometimes is marked as ◄) in each page.
5. To close the OSD control, exercise “call preset number 88” again.

Warning:

OSD setup and control are relatively sophisticated. To make proper adjustments, it is suggested to consult with the original installer or experienced technician.

In case of getting lost or mess in setting, find the “Default” option, activate it and you will retrieve the factor settings and get back to the original status.

In the next page there will be more information about what are available for camera setup through OSD, and how to do.

8.2 OSD function List

Total 30 items are included in the OSD menu. Each has two or multiple sub-items for selection or adjustment. All functions are listed in the tables on next page:

OSD functions list (1)		
1	Camera ID	Off
		On
2	SENSE UP	
3	AISHUT	AUTO.
		FIX.
4	AES	FIX.
		AUTO.
5	BLC	OFF
		On
6	AGC	
7	WHITE BAL	ATW.
		AWB.
8	SYNC	Off
		On
9	ZOOM	
10	DIGITAL ZOOM	
11	FOCUS	
12	AUTO FOCUS	Off
		On
13	POSITION	LOAD.
		SAVE.
		ALARM
		OSD
14	H-GAIN	
15	V-GAIN	
16	MOTION	Off
		On
17	IR	Off
		On
18	INITIAL	Off
		On
19	DEFAULT	Cancel
		OK
20	FREEZE	Off
		On
21	FREEZE MODE	FIELD
		FRAME
22	ZOOM SPEED	
23	FOCUS SPEED	
24	GAMMA	GAMMA.1
		GAMMA.2

OSD function list (2)		
25	ZOOM+AF	Off
		On
26	AF SLEEP	Off
		On
27	SCALE	Off
		On
28	LANGUAGE	ENGLISH
		DEUTSCH
		ITALIANO
29	WINKER	Off
		On
30	MISC	H-REVERS
		V-REVERS
		POSI/NEGA
		PRIORITY
		MASK A
		MASK B

8.3 OSD function description

1. **Camera ID** ➔ 2 sub-items
   This is for setting up number or name for camera, providing the convenience to user for distinguishing one camera from others by specific name.

   - **Off** is not used for putting the number or name on screen.

   - **On** is for giving the number or name to the camera.
     Edit: When Edit is selected, the screen of string of 20 characters will be display, ready for alpha-numeric setting. Push the joystick right-ward for the second time will pop the alpha-numeric list for selection. The character currently located is displayed on above of the line in larges scale
     Position: is to choose the position for camera name to be displayed.

2. **Sense up** ➔ is the abbreviation of sensitivity. It gives user the ability to set up sensitivity for AGC function (AGC function is for controlling dynamic headroom). 9 options are available in this item, with default of “OFF”.

3. **AISHUT** ➔ Auto or Fix

   - **Auto**
     When auto mode is chosen, there will be a number shown on the right hand side of the word “Auto”. The number is the output level set for this mode. If “Auto” is not the selected mode, then the number will not show, and entering to the level adjustment will be prohibited.
     To make adjustment, use up / down of joystick or arrow keys. Use visual feedback from screen, which will change during the adjustment, until the desired outcome is reached. **Default level is +4.**
   - **Fix**
     Like the auto mode, the output level setting will be shown in the line of this item on the screen. The adjustment procedure is the same as Auto mode. **Default level is also +4.**

4. **AES** ➔ Auto or Fix
   AES. AES means **A**uto-**E**lectronic-**S**huttle, which controls the CCD exposure in electronic way. It also has two optional modes of Auto and Fix. The longer the exposure time is chosen (for instance, 1/100 is 8 times longer than 1/10000), the brighter the picture will be. However, it also takes the risk of over-exposure in strong light environments.
   Default is Fix mode and in **OFF** position**,** to obtain maximum exposure.

5. **BLC** ➔ On or Off

Back-**L**ight-**C**ompensation, a function used for adjusting the exposure level automatically in the conditions that lens is facing strong spot light source, which normally drives AES or AISHUT too much and cause object too dark.

- **Off :**To utilize this function, turn it on with the ON/OFF selection firstly

- **On :** BLC AREA, make proper mask to block the light source. To do that, user must situate the lens to cover the target precisely

  BLC LEVEL, choose an appropriate sensitivity for the function

6. **AGC** ➔ **AGC** stands for **A**utomatic **G**ain **C**ontrol. It maintains video level as constant against variable input levels, therefore keeps the brightness of image stable.

There are 9 optional levels of headroom for the AGC setting. Factory default is set to the maximum level of 18dB which gives the maximum dynamic headroom. The smaller number, while has less dynamic range, responds faster to get stable image during the changes of brightness.

7. **White BAL**➔ ATW / AWB and related adjustments

Color tone function is mainly about color temperature setup. Two options are offered to users, with default of **ATW**

- **ATW** function, standing for **A**uto-**T**racking-**W**hite balance, will monitor the ambient color temperature and makes adjustment to the white balance of video output automatically by the internal microprocessor. The operation range of color temperature is from 2,500 to 9,500^{o}K.

User may decide the preferred color temperature with **ATW level** function. ATW level allows user to choose more blue or more red the background is.

- **AWB** standing for **A**uto-**W**hite-**B**alance, is a conventional way which requires a reference target in white color to be shot for white balancing. The drawback of it is, if the color temperature keeps on changing, such adjustment will be needed frequently. Like ATW, the AWB also provides option to user for more blue or red.

For advanced color adjustments, use options R-Y and B-Y. However, these will demand more practical experience, so it is suggested not to make such change on these unless skilled advisor is available.

To switch between ATW and AWB, enter White Balance to make the change

8. **SYNC ➔** On or Off
This is to give installer the option of using internal synchronization or external (usually the AC24V).
Since this device does NOT work with AC voltage, always keep this in **Off** mode.

9. **Zoom ➔** 1~23 Times
To let user do zoom in and out. Usually this is replaced by hardware buttons on control device

10. **Digital Zoom ➔** On or Off
To set up digital zoom function, Factory default setting is OFF.

11. **Focus ➔**
To let user make focus adjustment. Usually this is replaced by hardware buttons on control device

12. **Auto Focus ➔** On or Off
To enable or disable the Auto-Focus function. Factory setting is Off.
➔ In **low light condition** or when target to be focused is **in low-contrast**, the auto-focus function may fail to deliver well focused image. In this case, use manual focus controls on the controlling device (normally labeled as FOCUS-IN / FOCUS-OUT) to obtain clear picture with visual judgment

13. **Position ➔** (reserved function)
(The POSITION function is to let user to preset up to 64 groups of parameters like zoom, focus…etc.)

14. **H-gain ➔**
The enhancement function is for changing sharpness of the object contour by controlling horizontal gain.

15. **V-gain ➔**
The enhancement function is for changing sharpness of the object contour by controlling vertical gain.

16. **Motion ➔** On / Off, Area, Level, Time, OSD
Motion is the short word of “Motion Detection”, a function used for detecting moving article in specific zone. Such detection is executed by digital signal processor in the camera.
- To engage it, turn on the **DETECTION** with the ON/OFF selection.

- Secondly, make proper mask to block the light source. To do that, the target area must be located precisely to cover the target zone.
- 3rd step is to choose an appropriate sensitivity for the function. This is an important item, and **the suggestion is to make test to the sensitivity setting with various moving objects (particularly the size) in different moving speeds**, to avoid or reduce unnecessary faulty function.
- 4th step is to decide how long the alarm signal should be retained on screen after an event is detected. Options are 10, 30 and 60 seconds.

The last item is to decide whether warning signal will be displayed on screen at event. This is set up with the OSD option

17. IR ➔ On or Off

To remove the IR cut filter and turn on the viewing capability in dark where is IR illumination is provided

IR cut filer is commonly used in most color cameras in order to gain the maximum quality of color image. However, the use of IR-cut filter also prohibits CCD from receiving IR illumination – the light source that assists camera to see in dark. Therefore, IR filter must be removed in dark to retrieve camera's visual ability in dark.

The function is in options of on and off.

18. Initial ➔ On or Off

When this function is set off, the control system will lock the zoom, focus and iris in their current positions. Before the function is switched on again, control panel will not make change to those. It is useful, for example, when making continuous monitor with auto-pan

To change the setup, enter "initial" and select the wanted option. The lens will perform a short journal of zooming when changing setting from OFF to ON (not for process from ON to OFF).

19. Default ➔ OK or Cancel

This is to turn all settings to factory preset condition.

To retrieve defaults, first enter the "Default", and choose "OK". After the function is activated, screen will turn into blue for few second and back to live picture with factory settings.

Refer to the table in Appendix 2 for factory default value.

20. Freeze ➔ On or Off

Freeze function is used for grabbing and displaying a picture in still condition.

21. **Freeze mode** ➔ Field / Frame
To choose whether a field or frame of picture shall be frozen.

22. **Zoom speed**
To choose the zooming speed. If fast zooming is desired, increase the zoom speed. If more accurate image size is required, choose medium or lower speed for zooming.

23. **Focus speed**
To tune focusing speed. Higher speed shall provide you a quicker stable picture, while medium or lower focusing speed is for acquiring better focusing in bad condition (see related information in “Auto-Focus” on above).

24. **Gamma** ➔ Gamma 1 / Gamma 2
Gamma correction is to correct the brightness seen by the camera to match the brightness displayed on monitor, which makes the monitor show the correct level of contrast.
Gamma 1 has wider contrast range, good for most indoor conditions.
Gamma 2 has compressed contrast range, which is normally used in outdoor where the light variation is very dynamic.
The default setting is Gamma 1.

25. **Zoom+AF**
This is to drive lens to carry out auto- focusing after making control of zoom-in or zoom-out. However, this function is not the guarantee of the best focusing result. Use manual focus control buttons on controller to fine tune the focus on specific target. (refer to “Auto-Focus” on above)
Default setting is the **Off** position

26. **AF Sleep** ➔ On or Off
The image change less than auto focus range in five minutes; the auto focus will sleep in AF Sleep on mode. Then the image change more +-6dB than auto focus range, the auto focus will wake up.

27. **Scale**
To switch the OSD function on or off

28. **Language** ➔ 3 sub-items
Three options of English, Deutsch and Italiano.

29. **Winker** ➔ On or Off
When winker is set on position, the round blinker will be display on the screen of top-right, The blinker means the camera is in normal operation.

30. MISC ➔

- **H-Revers ➔** On or Off

This is for turning picture from left to right, or called “Mirror”
To activate it, first enter the “H-reverse”, and choose “ON” in sub-menu.

- **V-Revers ➔** On or Off

This is for turning picture up side down, or called “Flip”
To activate it, first enter the “V-reverse”, and choose “ON” in sub-menu.

- **Posi/NEGA ➔** To change image to positive or negative mode

- **Priority ➔** is to choose the determining item between AGC (headroom) and sensitivity for internal circuit to follow.

- **MASK A**

Mask function is to provide privacy protection to special object. A rectangular shadow in black color with programmable size will block the object considered as privacy from being displayed on monitor or recorded by DVR.

This camera offers two masks --- MASK A and B. These two are identical in function and operation, but can be set up and enable / disable separately.
To enable this function, first turn the function on by entering the sub-item “MASK 1” and choosing ON.
The 2nd step is to move the shadow to the position, with functions of “H-position” and “V-position”.
The last step is to define the mask area, which is composed with the “H-size” and “V-size”; Use joystick or arrow key to make up the shadow area.

The “Connected” function appeared in sub-menu is to stick the mask in proportion to the protected object(s) when object size is enlarged or shrunk with **zoom** function, or re-positioned with **reverse** functions.

- **MASK B**

The secondary Mask function. Operation is the same as MASK A.

9. Pre-defined System Functions

Power-up action

After the power is first applied to a dome it will perform a self-test procedure. This calibrates and checks the basic functions of the dome. External controls are overruled during this self-test period.

After the self-test, the PTZ camera will be ready for control. If the device was running the Auto-pan function before power was broken, the speed dome will retrieve Auto Scan function until new control is given by an operator.

Tour group

The speed dome software automatically groups the first 16 presets into 4 tour groups. i.e. presets 1 ~ 4 is owned by group 1; Preset number 5 to 8 belong to group 2… etc.

When tour function is initiated, the P/T mechanism will start scanning automatically around all the presets included in the group.

How to initiate tour function is subject to controllers.

10. Specification

■ Camera Module and Lens

CCD	Manufacturer	Sony
	Resolution	480 TV lines
	Size	1/4”
Image control		OSD menu
Zoom	Optical	23x
	Digital	10x
Focal length		3.6 ~ 82.8 mm
Aperture size		F 1.6 ~ 3.8
Light sensitivity	Color mode	0.5 lux
	Black / white	0.1 lux

■ Pan / Tilt Functions

PT driving system		Stepping motors
Scan / Search	Navigation range	Pan 360° / continuous
		Tilt (90°)+ auto-rotation (180°)
	Navigation speed	0.25 ~ 240° / sec; programmable
	Preset Search	300° per second
Preset	Quantity	Max to 64 positions
	Dwell time	1 ~ 255 seconds
	Tour group	4
	Auto-pan	Yes
Communication		RS-485
Protocol		Pelco D, Pelco P,
Baud rate		2400, 4800, 9600
Camera ID		1 ~ 128

■ Miscellaneous

Video	Format	NTSC or PAL (optional)
	Output Level	1.0 V (typical)
Alarm function	Input	3 sets
	Input level	TTL 5V; Negative trigger
	Output	1 set; NC / NO
	Max. load of O/P port	DC24V / 1A or AC120V / 0.5A
Connectivity	Video	BNC female
	RS-485	Terminal block
	Power	DC input jack
Power consumption		DC 12V / 1.5A
Operation	Temperature	-10 ~ 50℃
	Humidity	20 ~ 85% RHD

Storage	Temperature	-20℃ ~ 60℃	
	Humidity	20 ~ 100% RHD	
Certification		FCC, CE	
Inside the box	Dome camera	1 set	
	User's manual	1 set	
(Option) Installation Kit	Screw Pack	1 set	
	Installation base	1 piece	
	Plastic Housing for surface mount		1 piece
	Metal bowl holder	1 piece	